

Application No. 10/716,181
Response to January 29, 2009 Office Action
Attorney Docket No.: F132

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Amendments to the Claims:

This listing of the claims will replace all prior versions and listings of claims in the application:

Listing of Claims

1. (currently amended) A method of exposing a planar cross-section of a structure composed of a first material, the method comprising:

 depositing a layer of a second material on said structure, said second material having mill rates at higher incidence angles that ~~closely approximate~~ match the mill rates of the first material at those incidence angles;

 directing an ion beam at the structure;

 milling the structure in order to expose a cross-section of the structure thereby producing a uniformly planar face on said exposed cross-section.
2. (currently amended) The method of claim 1 in which said second material has mill rates at incidence angles greater than 75 degrees that ~~closely approximate~~ match the mill rates of the first material at incidence angles greater than 75 degrees.
3. (currently amended) The method of claim 2 in which said second material has mill rates at incidence angles greater than 75 degrees that that are equal to or ~~slightly greater~~ than the mill rates of the first material at incidence angles greater than 75 degrees.
4. (currently amended) The method of claim 1 in which said second material has mill rates at incidence angles greater than 45 degrees that ~~closely approximate~~ match the mill rates of the first material at incidence angles greater than 45 degrees.

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5. (currently amended) The method of claim 4 in which said second material has mill rates at incidence angles greater than 45 degrees that are equal to or ~~slightly greater than~~ the mill rates of the first material at incidence angles greater than 45 degrees.

6. (original) The method of claim 1 in which said structure comprises a write-head for a magnetic disk system.

7. (original) The method of claim 1 in which said first material comprises an alloy of Ni and Fe.

8. (original) The method of claim 1 in which said second material comprises carbon.

Claims 9-14 Cancelled.

15. (currently amended) A method of measuring a dimension of a cross-section of a structure composed of a first material, the method comprising:

depositing a layer of a second material on said structure, said second material having mill rates at higher incidence angles that matches closely approximate the mill rates of the first material at those incidence angles;

directing an ion beam at the structure in order to expose a planar cross-section of the structure and said layer of a second material;

directing an electron beam at the planar cross section;

determining the edge positions for the desired dimensions of the cross-section; and

determining the distance between said edge positions.

16. (currently amended) The method of claim 15 in which said second material has mill rates at incidence angles greater than 75 degrees that matches closely approximate the mill rates of the first material at incidence angles greater than 75 degrees.

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17. (currently amended) The method of claim 16 in which said second material has mill rates at incidence angles greater than 45 degrees that are equal to or slightly greater than the mill rates of the first material at incidence angles greater than 45 degrees.

18. (currently amended) The method of claim 15 in which said second material has mill rates at incidence angles greater than 45 degrees that matches ~~closely approximate~~ the mill rates of the first material at incidence angles greater than 45 degrees.

19. (currently amended) The method of claim 18 in which said second material has mill rates at incidence angles greater than 45 degrees that are equal to or slightly greater than the mill rates of the first material at incidence angles greater than 45 degrees.

20. (original) The method of claim 15 in which said first material comprises an alloy of Ni and Fe.

21. (previously presented) The method of claim 15 in which said second material is carbon.

22. (original) The method of claim 15 in which directing an ion beam at the structure in order to expose a planar cross-section of the structure and said layer of a second material, comprises focused ion beam milling.

23. (original) The method of claim 15 in which determining the edge positions on cross-section comprises forming an image of said cross-section on an image forming device and applying an algorithm to assign an edge position based upon gray-level variations.

24. (currently amended) A method of choosing a first material to be deposited as a protective layer on a structure composed of a second material prior to milling in order to control topological variation of a cross-section of said structure, the method comprising:

determining ~~the desired~~ whether a planar or non-planar cross-section topography is desired;

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determining the approximate mill rate of the second material at higher incidence angles;
if a planar cross-section is desired, selecting a first material from known materials having a mill rate at higher incidence angles that match the mill rates of the first material at those incidence angles; and

if a non-planar cross-section is desired, selecting a first material from known materials having a mill rate at higher incidence angles that does not match the mill rates of the first material at those incidence angles will produce the desired topography of the cross-section face.

25. Cancelled.

26. (currently amended) The method of claim 24 ~~claim 25~~ in which a planar cross-section is desired and in which selecting a first material from known materials comprises selecting a first material having mill rates at incidence angles greater than 75 degrees that closely approximate match the mill rates of the first material at incidence angles greater than 75 degrees.

27. (currently amended) The method of claim 26 in which selecting a first material from known materials comprises selecting a first material having mill rates at incidence angles greater than 75 degrees that are equal to or slightly greater than the mill rates of said second material at incidence angles greater than 75 degrees.

28. (currently amended) The method of claim 24 ~~claim 25~~ in which a planar cross-section is desired and in which selecting a first material from known materials comprises selecting a first material having mill rates at incidence angles greater than 45 degrees that closely approximate match the mill rates of the first material at incidence angles greater than 45 degrees.

29. (currently amended) The method of claim 28 in which selecting a first material from known materials comprises selecting a first material having mill rates at incidence angles greater

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than 45 degrees that are equal to or ~~slightly~~ greater than the mill rates of said second material at incidence angles greater than 45 degrees.

30. (currently amended) The method of claim 25 in which selecting a first material from known materials comprises:

selecting a preliminary group of materials from known materials with mill rates at higher incidence angles that ~~closely approximate~~ match the mill rates of said second material at higher incidence angles;

determining the electron emission coefficient of said second material;

determining the electron emission coefficient of each selected preliminary material; and

selecting from said preliminary group, an appropriate first material having the greatest relative difference in electron emission coefficient as compared to said second material.

31. (currently amended) The method of claim 30 in which selecting a first material from known materials comprises selecting a first material having mill rates at incidence angles greater than 45 degrees that ~~closely approximate~~ match the mill rates of the second material at incidence angles greater than 45 degrees.

32. (currently amended) The method of claim 30 in which selecting a first material from known materials comprises selecting a first material having mill rates at incidence angles greater than 75 degrees that ~~closely approximate~~ match the mill rates of the second material at incidence angles greater than 75 degrees.

33. Cancelled.

34. (currently amended) The method of ~~claim 33~~ claim 24 in which a non-planar cross-section is desired and in which selecting a first material from known materials comprises

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selecting a first material having mill rates at incidence angles greater than 45 degrees that do not closely approximate match the mill rates of the first material at incidence angles greater than 45 degrees.

35. (currently amended) The method of ~~claim 33~~ claim 24 in which a non-planar cross-section is desired and in which selecting a first material from known materials comprises selecting a first material having mill rates at incidence angles greater than 75 degrees that do not closely approximate match the mill rates of the first material at incidence angles greater than 75 degrees.

36. (currently amended) The method of ~~claim 24~~ claim 34 in which the desired cross-section topography comprises a recessed cross-section face.

37. (original) The method of claim 36 in which selecting a first material from known materials comprises selecting a first material having mill rates at incidence angles greater than 45 degrees that are that are substantially lower than the mill rates of said second material at incidence angles greater than 45 degrees.

38. (original) The method of claim 36 in which selecting a first material from known materials comprises selecting a first material having mill rates at incidence angles greater than 75 degrees that are that are substantially lower than the mill rates of said second material at incidence angles greater than 75 degrees.

39. (original) A method of measuring the width of a structure composed of permalloy, the method comprising:

coating the structure with a layer of carbon;

directing a charged particle beam at the structure in order to expose a planar cross-section;

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directing an electron beam at the cross-section; and

measuring the width of the structure cross-section.

40. Cancelled.

41. Cancelled.

42. (previously presented) A method of exposing a planar cross-section of a structure composed of a first material, the method comprising:

selecting a second material from known materials having a mill rate at higher incidence angles that approximates the mill rates of said first material at higher incidence angles;

depositing a protective layer of the second material on said structure;

directing an ion beam at the structure;

milling the structure in order to expose a cross-section of the structure and the protective layer thereby producing a uniformly planar face on said exposed cross-section.

43. (previously presented) The method of claim 42 in which said second material has mill rates at incidence angles greater than 75 degrees that approximate the mill rates of the first material at incidence angles greater than 75 degrees.

44. (previously presented) The method of claim 43 in which said second material has mill rates at incidence angles greater than 75 degrees that are equal to or greater than the mill rates of the first material at incidence angles greater than 75 degrees.

45. (previously presented) The method of claim 42 in which said second material has mill rates at incidence angles greater than 45 degrees that approximate the mill rates of the first material at incidence angles greater than 45 degrees.

46. (previously presented) The method of claim 45 in which said second material has mill

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rates at incidence angles greater than 45 degrees that are equal to or greater than the mill rates of the first material at incidence angles greater than 45 degrees.